Middle East and North Africa Water Information System Platform

1. INTRODUCTION

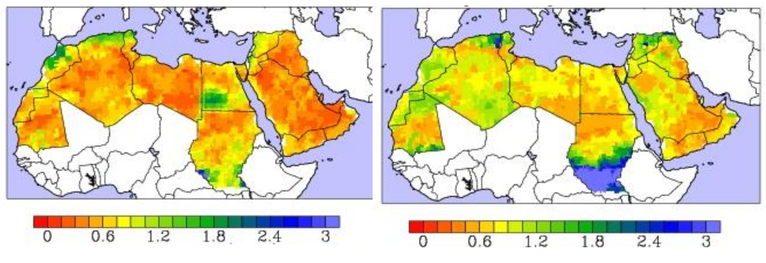
In October 2011, The World Bank, USAID Office of Middle East Programs and NASA Goddard Space Flight Center have initiated a collaborative Water Information System Platform (WISP) project.

- to study multiple hydrological issues in the MENA region to improve the policy and management decision process.
- The MENA Water Information System Platform (WISP) harnesses cutting edge space-based earth observations and hydrological modeling and represents a new era in water resources assessment in the region.
- Assist the MENA countries in customizing and adapting such models for regional scale applications.
- Expected outcomes from this effort includes the near-real time operational monitoring of hydrological states and fluxes, agriculture management and emergency response.
- The MENA WISP project involves the following nations:
  - *The National Center for Remote Sensing, Lebanon;*
  - *Ministry of Water and Irrigation, Jordan;*
  - *The Royal Center for Remote Sensing and Space Science, Morocco;*
  - *National Authority for Remote Sensing, Egypt;*
  - *Regional Center for Remote Sensing, Tunisia.*
- The MENA WISP project builds upon the initial installation (completed in collaboration with OMEP) of this modeling framework operating at the International Center for Biosaline for Agriculture (ICBA), Dubai

2. COUNTRY NEEDS

Requirement	Egypt	Jordan	Lebanon	Morocco	Tunisia
Evapotranspiration	x	x	x	x	x
Drought	x	x	x	x	x
Flood Detection and Modeling	x			x	x
Climate Impact	x	x	x	x	x
Irrigation and Crop Mapping		x	x	x	x
Locust Monitoring				x	x
Hydrological Modeling	x	x	x	x	x
Fires	x	x	x	x	x
Direct Readout Station			x	x	x

3. MENA Water Balance



Mean Evapotranspiration December 2002 – February 2003

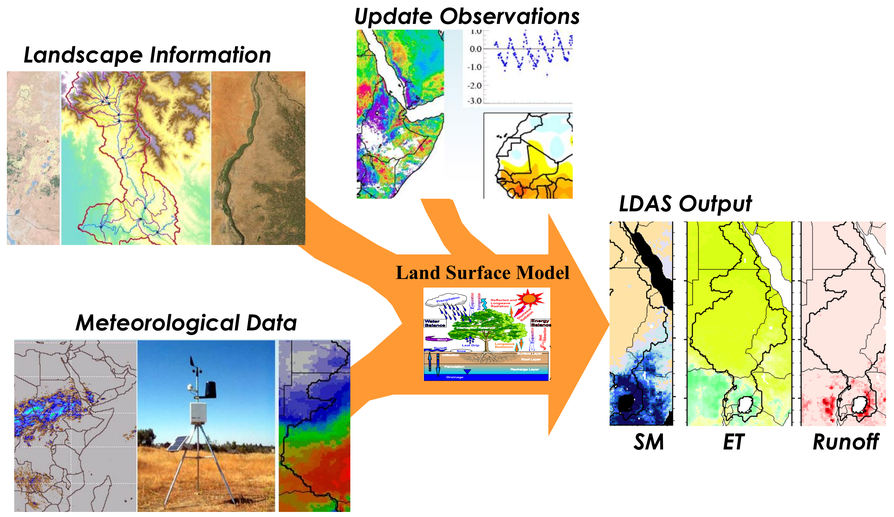
Mean Evapotranspiration June 2003 – August 2003

Gravity Recovery and Climate Experiment (GRACE) satellite mission provides large scale (>200,000 km^2) estimates of changes in total terrestrial water storage (the sum of groundwater, soil moisture, snow, and surface waters) on a monthly basis.

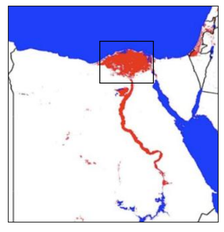
Ref: J. Bolten/GSFC

4. HYDROLOGICAL MODELING

A ***Land Data Assimilation System*** (LDAS) is a computational tool that merges **observations** with **numerical models** to produce optimal estimates of ***land surface states and fluxes***.

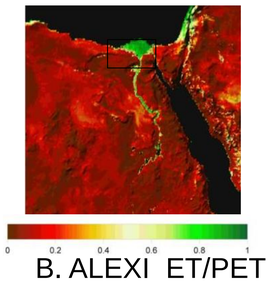


5. SIMULATING THE EFFECTS OF IRRIGATION



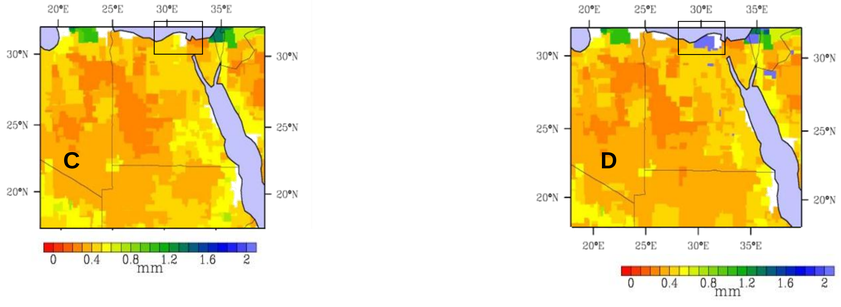
A. Irrigation from MODIS

Ref: M. Ozdogan/U of Wisconsin



B. ALEXI ET/PET

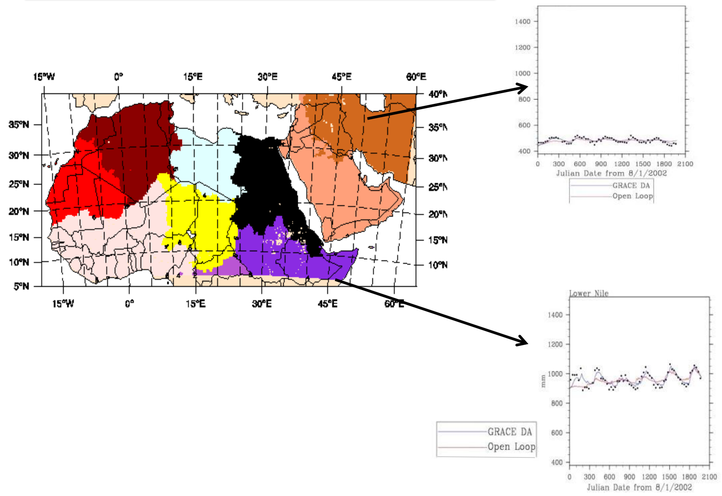
Ref: M. Anderson/USDA



Ref: J. Bolten/GSFC

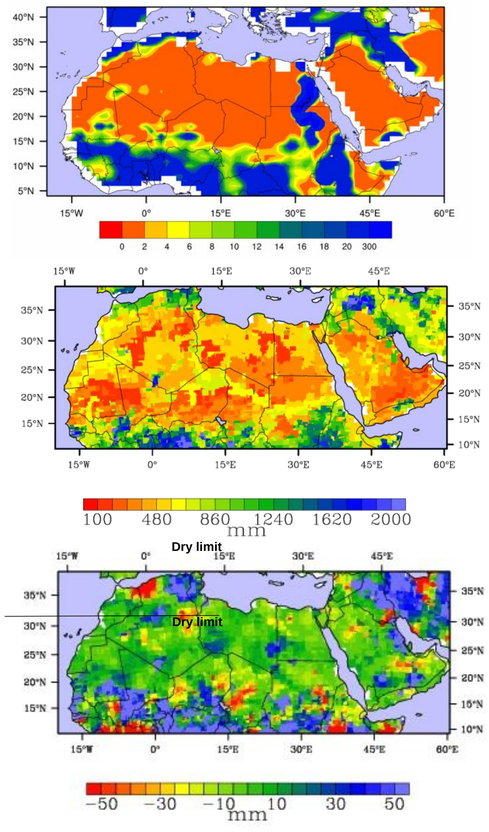
Nile delta and Basin irrigation. Irrigated lands near the Nile delta; (A) MODIS-derived irrigation intensity, (B) average ET/PET provided by the Atmosphere-Land Exchange Inverse Model; (C) MENA-LDAS modeled daily ET without irrigation algorithm; (D) MENA-LDAS modeled daily ET with irrigation algorithm.

6. GRACE DATA ASSIMILATION



Ref: J. Bolten/GSFC

7. SEASONAL CHANGES IN WATER STORAGE



Variance of GRACE Anomalies (June 2002-2010)

Average TWS JJA 2005 - Model Only

Difference in TWS for JJA 2005 (GRACE DA – Model)

Ref: J. Bolten/GSFC

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